

U.S. Patent Application Serial No. 10/543,185
Amendment filed June 16, 2010
Reply to OA dated March 16, 2010

AMENDMENTS TO THE CLAIMS:

Please amend claim 6, and add new claim 18, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Withdrawn): Semiconductor ultrafine particles, which maintain 50% or more fluorescence quantum yield of photoluminescence when the particles are kept dispersed in water at 10°C to 20°C in air for five days.

Claim 2 (Withdrawn): Semiconductor ultrafine particles according to Claim 1, wherein the particles belong to Group II-VI semiconductor ultrafine particles.

Claim 3 (Withdrawn): Semiconductor ultrafine particles according to Claim 2, wherein the fluorescence quantum yield is measured when they are kept dispersed in an aqueous solution having a pH of 10 to 12 comprising a water-soluble compound containing a Group II element (about 0.001 to about 0.05 mol/L) as a starting material of the semiconductor ultrafine particles of Group II-VI and a surfactant (about 1 to 1.5 mol per mol of the Group II element contained in the aqueous solution).

U.S. Patent Application Serial No. 10/543,185
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Claim 4 (Withdrawn): Semiconductor ultrafine particles according to Claim 2, wherein the particles are cadmium telluride.

Claim 5 (Canceled).

Claim 6 (Currently amended): A fluorescent material comprising semiconductor ultrafine particles having 20% or more fluorescence quantum yield of photoluminescence dispersed in a glass matrix formed by a sol-gel process using an organoalkoxysilane represented by General Formula:

$X\text{-Si(OR)}_3$

wherein X is a group containing a vinyl group, a group containing an epoxy group, an amino alkyl group, an acryloyl alkyl group, a methacryloyl alkyl group, a mercapto alkyl group or a phenyl group, OR is an alkoxy group, and group X is bonded to Si through a silicon-carbon bond.

Claim 7 (Original): A fluorescent material according to Claim 6, wherein a concentration of semiconductor ultrafine particles in the glass matrix is 2×10^{-6} to 2×10^{-4} mol/L.

Claims 8-9 (Canceled).

Claim 10 (Withdrawn): A method for manufacturing semiconductor ultrafine particles according to Claim 2, the method comprising introducing a compound containing a Group VI

U.S. Patent Application Serial No. 10/543,185

Amendment filed June 16, 2010

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element under an inert atmosphere into an aqueous alkaline solution in which a water-soluble compound containing a Group II element and a surfactant are dissolved;

wherein the amount of surfactant is about 1 to about 1.5 mol per 1 mol of the Group II element; and

ultrapure water in which the specific resistance is 18 MΩ·cm or more and the total amount of organic compound (TOC) contained therein is 5 ppb or less is used as a solvent.

Claim 11 (Withdrawn): A method of manufacturing a fluorescent material according to Claim 5, the method comprising adding a dispersion of semiconductor ultrafine particles according to Claim 1 to a sol solution containing a metal alkoxide, to cause hydrolysis and condensation polymerization, thereby forming a glass matrix.

Claim 12 (Withdrawn): A method of manufacturing a fluorescent material according to Claim 11, the method comprising adding a dispersion of semiconductor ultrafine particles according to Claim 5 to a sol solution containing a metal alkoxide, to cause hydrolysis and condensation polymerization, thereby forming a glass matrix;

wherein the dispersion of the semiconductor ultrafine particles is added when the viscosity of the sol solution containing a metal alkoxide reaches 300 centipoises to 3000 centipoises.

Claim 13 (Previously presented): A light emitting device comprising:

U.S. Patent Application Serial No. **10/543,185**

Amendment filed June 16, 2010

Reply to OA dated March 16, 2010

a light emitter composed of a fluorescent material according to Claim 6; and
a light source which emits excitation light with a wavelength of 320 nm to 600 nm for
exciting the fluorescent material.

Claim 14 (Previously presented): A fluorescent material according to Claim 6, wherein the
alkoxy group is a methoxy group, ethoxy group, n-propoxy group or isopropoxy group.

Claim 15 (Previously presented): A fluorescent material according to Claim 6, which has a
Vickers hardness of about 20 or higher.

Claim 16 (Previously presented): A fluorescent material according to Claim 6, wherein the
semiconductor ultrafine particles belong to the Group II-VI semiconductor ultrafine particles.

Claim 17 (Previously presented): A fluorescent material according to Claim 6, wherein the
semiconductor ultrafine particles are cadmium telluride.

Claim 18 (New): A fluorescent material according to Claim 6, wherein:
the group containing a vinyl group is a group shown by $\text{CH}_2=\text{CH}-$ or $\text{CH}_2=\text{CH}-\text{Ph}$ (Ph : a
phenyl group);

U.S. Patent Application Serial No. **10/543,185**

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the group containing an epoxy group is a group shown by $\text{CCO}-(\text{CH}_2)_k-\text{OC}_3\text{H}_6-(\text{CCO})$
represents an epoxy group, and k is an integer of 1 to 6);

the amino alkyl group is a group represented by $\text{NH}_2\text{C}_m\text{H}_{2m}-$ (m is an integer of 1 to 6);

the acryloyl alkyl group is a group represented by $\text{CH}_2=\text{C}(\text{CH}_3)\text{CO}-\text{O}-\text{C}_p\text{H}_{2p}-$ (p is an
integer of 1 to 5);

the methacryloyl alkyl group is a group represented by $\text{CH}_2=\text{CHCO}-\text{O}-\text{C}_j\text{H}_{2j}-$ (j is an integer
of 1 to 5); and

the mercapto alkyl group represented by $\text{HSC}_q\text{H}_{2q}-$ (q is an integer of 1 to 10).